

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of: Li-Ying Yang

Confirmation No.: 1913

Filed: June 19, 2006

Group Art Unit: 1794

Application No: 10/565,465

Examiner: Sheeba Ahmed

For: SINGLE PLY THERMOPLASTIC POLYOLEFIN (TPO) ROOFING MEMBRANES  
HAVING SUPERIOR HEAT SEAM PEEL STRENGTHS AND LOW  
TEMPERATURE FLEXIBILITY

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P.O. Box 1450  
Alexandria, VA 22313-1450

DECLARATION OF DR. LI-YING YANG



FDN-2794

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Li-Ying Yang ) Group Art Unit 1773  
Serial No. : 10/627,847 ) Examiner Monique R. Jackson  
Filed : 07/25/2003 )

For : SINGLE PLY THERMOPLASTIC POLYOLEFIN (TPO)  
ROOFING MEMBRANES HAVING SUPERIOR HEAT SEAM  
PEEL STRENGTHS AND LOW TEMPERATURE FLEXIBILITY

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

DECLARATION UNDER 37 CFR 1.132  
OF DR. LI-YING YANG

1. I, DR. LI-YING YANG, hereby depose and say:
2. That I am a named inventor in the above-identified U.S. patent application.
3. That I received a Bachelor of Engineering in Chemical Engineering, June 1988, Tamkang University, Taipei, Taiwan, a Master of Science in Chemical Engineering, May 1991, University of Maryland at College Park, MD, Thesis Title: "Melting and Solidification Behavior of Blends of Poly(Butylene Terephthalate) and High Density Polyethylene" and a Ph.D. in Chemical Engineering, May 1994, University of Maryland at College Park, MD, Dissertation Title: "Morphological Development during Blending of Linear Low Density Polyethylene and Polystyrene".

SERIAL NO. 10/627,847

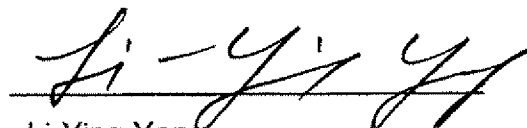
That I was a Research Scientist (July 1995-August 1999), at Armstrong World Industries, Innovation Center, Lancaster, Pennsylvania and Principal Scientist (August 1999-Present), GAF Materials Corporation, R&D, Wayne, New Jersey. Technical leader in a single-ply thermoplastic polyolefin products.

That I am a named inventor in 3 U.S. patents, 4 U.S. patent applications, and 6 technical publications, in the fields of polymer engineering, and roofing products.

4. That the invention claimed herein was reduced to practice before the effective date of March 12, 2002 of the Glogovsky U.S. Patent 6,743,843 reference which was the filing date of the provisional application.

5. That I prepared a single ply roofing membrane as shown in my notebook pages (copy attached) according to the claims of the application in which both cap and base layers were made of metallocene-catalyzed polyethylene and additives, and it had the peel strength and brittleness point of claim 1.

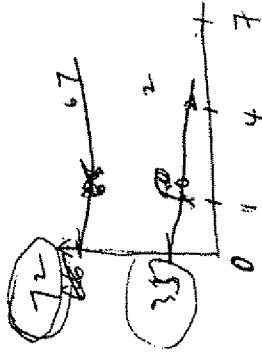
6. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

  
Li-Ying Yang

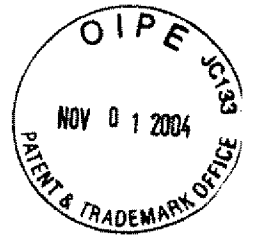
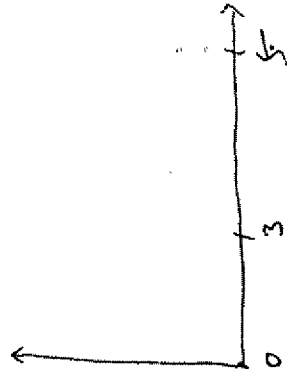
Date 10/28/04

Attachment – Notebook pages

Over aging  
ASTMD-413



outdoor exposure  
% seam



Over Aged (158F)

Sample	Date Produced	Date put in	Date Tested	Aging Days	Clean Procedure	Welding Speed (FPM)	% FTB	AVG. Load	S.D. Max. Load	AVG. Load @ 2" ext.	S.D. Load @ 2" ext.	Hand Pulled %FTB	Comments
TPO2+	Control Cap to Control Core			0	Unclean	12'							
TPO2+				1	Unclean	12'	0	10	7	3	7	0	
TPO2+				1	Unclean	16'	0	2	1	0	0	0	
TPO2+				1	Unclean	Hand weld	0	12	3	6	3	50	
TPO2+				4	Unclean	12'	0	22	1	1	1	0	
TPO2+				4	Unclean	16'	0	1	0	1	0	0	
TPO2+				4	Unclean	Hand weld	0	3	2	1	1	0	
TPO2+				7	Xylene	12'	75	27	4	23	2	100	
TPO2+				7	Xylene	16'	5	15	6	8	2	90	
TPO2+				7	Xylene	Hand weld	5	14	1	8	2	80	

Over Aged (158F)

Sample	Date Produced	Date put in	Date Tested	Aging Days	Clean Procedure	Welding Speed (FPM)	% FTB	AVG. Load	S.D. Max. Load	AVG. Load @ 2" ext.	S.D. Load @ 2" ext.	Hand Pulled %FTB	Comments
TPO2+EX	Control Cap to Control Core			0	Unclean	12'							
TPO2+EX				1	Unclean	12'	40	26	16	10	14	100	
TPO2+EX				1	Unclean	16'	0	11	5	0	0	0	
TPO2+EX				1	Unclean	Hand weld	0	11	4	7	2	20	
TPO2+EX				4	Unclean	12'	55	19	3	16	3	95	
TPO2+EX				4	Unclean	16'	0	1	1	0	0	0	
TPO2+EX				4	Unclean	Hand weld	0	1	1	0	0	0	
TPO2+EX				7	Xylene	12'	95	41	9	35	10	100	
TPO2+EX				7	Xylene	16'	45	31	4	23	3	100	
TPO2+EX				7	Xylene	Hand weld	75	26	2	22	5	100	

Sample	Date Produced	Date put in	Date Tested	Aging Days	Clean Procedure	Welding Speed (FPM)	% FTB	AVG. Load	S.D. Max. Load	AVG. Load @ 2" ext.	S.D. Load @ 2" ext.	Hand Pulled %FTB	Comments
EX1	Control Cap to Control Core			0	Unclean	12'	100	12	5			100	
EX1	Control Cap to Control Core			0	Unclean	16'	100	86	4	32	3	100	
EX1	Control Cap to Control Core			0	Unclean	Hand weld	100	63	4	44	6	100	
EX1				1	Unclean	12'	100	65	2	32	1	100	
EX1				1	Unclean	16'	100	65	6	35	3	100	
EX1				1	Unclean	Hand weld	85	74	9	50	7	100	
EX1				4	Unclean	12'	100	67	2	64	4	100	
EX1				4	Unclean	16'	100	67	5	41	3	100	
EX1				4	Unclean	Hand weld	100	63	7	51	12	100	
EX1				7	Unclean	12'	100	71	4	56	12	100	
EX1				7	Unclean	16'	100	68	5	57	10	100	
EX1				7	Unclean	Hand weld	90	80	13	65	15	100	



Formulations for test in Week of

Sample ID	TPO2+	TPO2+EX	TPO2+
Formulation layer	Core	Core	Cap
Raw Materials			
DFDB 1085	61	61	50
Exxon 3128 (M. I.=1.2)			
DMDA 8920	17		
CEFOR(PP)	17		
Exxon 3022 (M. I.=9)		34	
JSR EP02P			10
Polybond 3000	2.5	2.5	
Mg(OH)2, Kisuma 5A			25
TiO2			5
CaCO3			5
Core Conc. (LR93534)	2.5	2.5	
Cap Concentrate			5
Total	100	100	100

Tensile

EX2

Week of

Sample ID	BS-Core4	BS-Cap2	EX-Core1	EX-Cap1
Formulation layer				
Raw Materials				
Exxon 3128 (MI=12)			76	29
Exxon 3022 (MI=9)			17.5	32.1
KS358	76	29		
KS359	17.5	32.1		
TiO2	1.5	3	1.5	3
Mg(OH)2	3	35	3	35
FS301		0.12		0.12
EB40-68FF		0.78		
Chemisorb119				0.47
Tinuvin123				0.31
Cap Conc.				
Core Conc.	2		2	
Total	100	100	100	100

BS-Core4+BS-Cap2=BS4  
EX-Core1+EX-Cap1=EX1

EG8150 (MI=0.5) ←  
8200 (MI=5) ←

pp.

Cap

EG8150

DMDA890

CEFOR (PP)

JSREPO2P

Polybond 3000

CaCO<sub>3</sub>

TiO<sub>2</sub>

Cap

59

22

13

8

3

10

35

5

5

38

19

AP01

16

